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वायु चालित तरल पावर-32 मि.मी. से 320 मि.मी. बोर तक वियोडय आरोपण एवं छड़ सिलिंडर 1 000 kPa (10 बार) श्रृंखला — आरोपण आयाम

(पहला पुनरीक्षण)

Indian Standard

PNEUMATIC FLUID POWER — SINGLE ROD CYLINDERS, 1 000 kPa (10 bar) SERIES, WITH DETACHABLE MOUNTINGS, BORES FROM 32 mm to 320 mm — MOUNTING DIMENSIONS

(First Revision)

UDC 621 5-222 : 621.8.033 : 006.78

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

July 1995

Price Group 6

Pneumatic Fluid Power Systems Sectional Committee, PE 16

NATIONAL FOREWORD

This Indian Standard (First Revision) which is identical with ISO 6431 : 1992 'Pneumatic fluid power — Single rod cylinders, 1 000 kPa (10 bar) series, with detachable mountings, bores from 32 mm to 320 mm — Mounting dimensions', issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Pneumatic Fluid Power Systems Sectional Committee and approval of the Production Engineering Division Council.

This standard was first published in 1982 based on ISO/DIS 6431 'Pneumatic fluid power systems — Single rod cylinders with detachable mountings — 10 bar series — Mounting dimensions'. Consequent upon printing of ISO 6431 : 1992, the revision of this standard was taken up and the committee dealing with the subject decided to adopt this as Indian Standard.

The text of the ISO standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Comma (,) has been used as a decimal marker in the International Standards while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

b) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

In the adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 228-1 : 1982	IS 2643 : 1975 Dimensions for pipe threads for fastening purposes (*first revision*) Part 1 Basic profile and dimensions Part 2 Tolerances Part 3 Limits of sizes	Technically equivalent
ISO 4393 : 1978	IS 10411 : 1983 Recommendations for nominal strokes for fluid power cylinders	Technically equivalent
ISO 4395 : 1978	IS 13533 : 1992 Fluid power cylinders — Piston rod thread dimensions and types	Identical
ISO 5598 : 1985	IS 10416 : 1992 Fluid power systems and components — Vocabulary (*first revision*)	Identical

This standard is one of the series of standards relating to mounting dimensions of pneumatic fluid power cylinders. Other standards in the series, which are an adoption of ISO standards are:

IS 12723 : 1988/ ISO 6432 : 1985	Pneumatic fluid power — Single rod cylinders — 1 000 kPa (10 bars) series — Bores from 8 mm to 25 mm — Mounting dimensions
IS 12738 : 1995/ ISO 6430 : 1992	Pneumatic fluid power — Single rod cylinders 1 000 kPa (10 bar) series, with integral mountings, bores from 32 mm to 250 mm — Mounting dimensions
IS 13086 : 1991/ ISO 8139 : 1986	Pneumatic fluid power — Cylinder 10 bars (1 000 kPa) series — Rod end spherical eyes — Mounting dimensions
IS 13087 : 1991/ ISO 8140 : 1986	Pneumatic fluid power — Cylinder 10 bars (1 000 kPa) series — Rod end clevis — Mounting dimensions

IS 10143 : 1995
ISO 6431 : 1992

Indian Standard

PNEUMATIC FLUID POWER — SINGLE ROD CYLINDERS, 1 000 kPa (10 bar) SERIES, WITH DETACHABLE MOUNTINGS, BORES FROM 32 mm to 320 mm — MOUNTING DIMENSIONS

(First Revision)

1 Scope

This International Standard establishes a metric series of mounting dimensions required for interchangeability of commonly used pneumatic cylinders for a maximum working pressure of 1 000 kPa (10 bar)[1].

It applies to pneumatic cylinders with detachable mountings.

NOTES

1 This International Standard allows manufacturers of pneumatic equipment freedom of design in metric cylinders and does not restrict technical development but provides basic guidelines.

2 ISO 6430 deals with cylinders for which mountings are integrated in the main body of the device.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 228-1:1982, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 4393:1978, *Fluid power systems and components — Cylinders — Basic series of piston strokes.*

ISO 4395:1978, *Fluid power systems and components — Cylinders — Piston rod thread dimensions and types.*

ISO 5598:1985, *Fluid power systems and components — Vocabulary.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

4 Dimensions

Basic dimensions are shown in figure 1 and are given in table 1.

Mounting dimensions for cylinders manufactured in accordance with this International Standard shall be selected from tables 2 to 9.

NOTE 3 The tolerances of dimensions dependent on stroke included in the tables apply for strokes up to and including 1 250 mm. If strokes are longer than 1 250 mm, tolerances should be selected from national standards or by agreement between the manufacturer and user.

5 Nominal stroke

5.1 Nominal strokes shall be selected from the recommended values shown in ISO 4393.

---

[1] 1 bar = 100 kPa = 10^5 Pa; 1 Pa = 1 N/m^2.

5.2 Nominal stroke tolerances are given in table 1.

Table 1 — Nominal stroke tolerances

Dimensions in millimetres

Bore	Nominal stroke, S	Nominal stroke tolerance[1]
32 40 50	$S \leqslant 500$	$^{+2}_{0}$
	$500 < S \leqslant 1\,250$	$^{+3,2}_{0}$
63 80 100	$S \leqslant 500$	$^{+2,5}_{0}$
	$500 < S \leqslant 1\,250$	$^{+4}_{0}$
125 160 200 250 320	$S \leqslant 500$	$^{+4}_{0}$
	$500 < S \leqslant 1\,250$	$^{+5}_{0}$

[1] See note 3 in clause 4.

6 Bore sizes

The following bore sizes, in millimetres, are included in this series:

32 — 40 — 50 — 63 — 80 — 100 — 125 — 160 —
200 — 250 — 320

7 Mounting styles

This International Standard includes the following mounting styles, as described in ISO 6099:

MF1 — Head, rectangular flange (see figure 2 and table 3)

MF2 — Cap, rectangular flange (see figure 3 and table 4)

MP2 — Cap, detachable clevis (see figure 4 and table 5)

MP4 — Cap, detachable eye (see figure 5 and table 6)

MS1 — End angles (see figure 6 and table 7)

MT4 — Intermediate fixed or movable trunnion (male) (see figure 7 and table 8)

MX1 — Both ends, studs or tie rods extended (see figure 8 and table 9)

8 Piston rod characteristics

8.1 This International Standard covers piston rods which have a shouldered male thread end (see figure 1 and table 2 for basic dimensions).

8.2 The dimensions of the piston rod threads are chosen in accordance with ISO 4395.

9 Identification statement (Reference to this International Standard)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

"Interchangeable cylinder mounting dimensions are selected in accordance with ISO 6431:1992, *Pneumatic fluid power — Single rod cylinders, 1 000 kPa (10 bar) series, with detachable mountings, bores from 32 mm to 320 mm — Mounting dimensions.*"

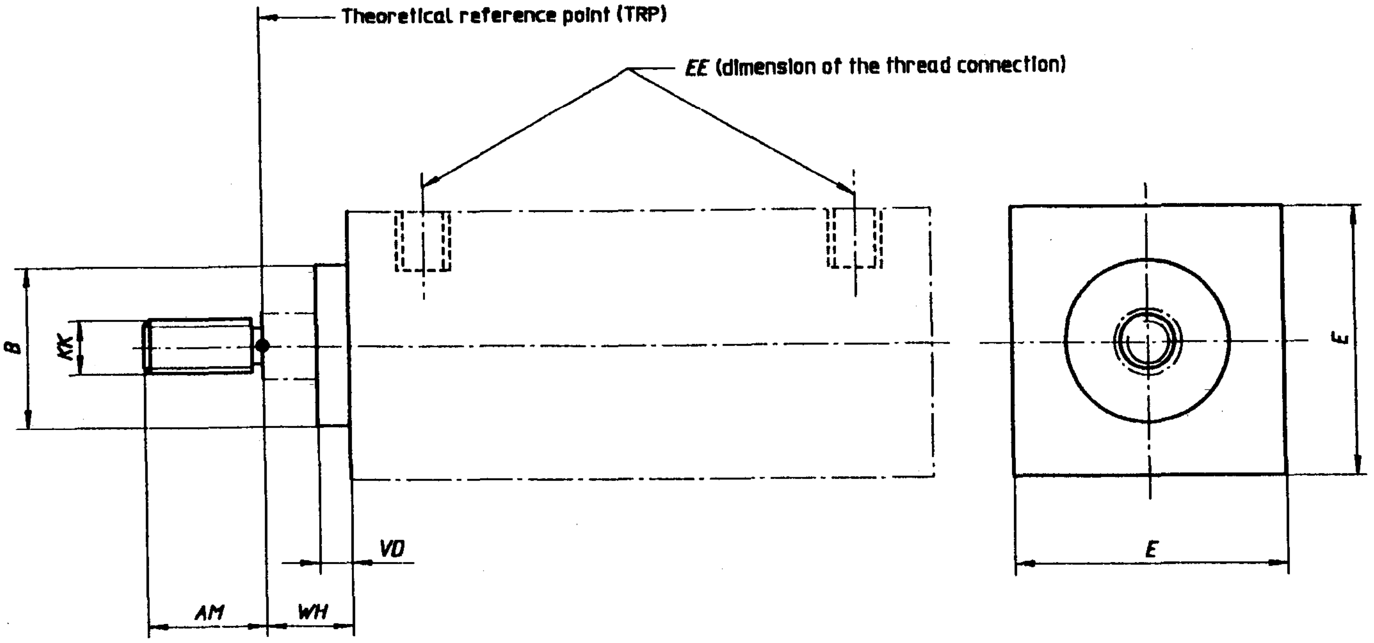
Theoretical reference point (TRP)
EE (dimension of the thread connection)
B
KK
VD
AM
WH
E
E

Figure 1 — Basic dimensions

Table 2 — Basic dimensions

Dimensions in millimetres

Bore	B	KK 1)	AM 1)		VD	WH	EE 2)		E
	max.		nom.	tol.		min.	metric	inch.	max.
32	30	M10 × 1,25	22	$^{0}_{-2}$	3)	16	M10 × 1	G1/8	50
40	36	M12 × 1,25	24			20	M14 × 1,5	G1/4	58
50	48	M16 × 1,5	32			25	M14 × 1,5	G1/4	70
63	48	M16 × 1,5	32			25	M18 × 1,5	G3/8	85
80	60	M20 × 1,5	40			30	M18 × 1,5	G3/8	105
100	60	M20 × 1,5	40			35	M22 × 1,5	G1/2	130
125	72	M27 × 2	54			45	M22 × 1,5	G1/2	157
160	108	M36 × 2	72			60	M27 × 2	G3/4	195
200	108	M36 × 2	72			70	M27 × 2	G3/4	238
250	126	M42 × 2	84			80	M33 × 2	G1	290
320	144	M48 × 2	96			90	M33 × 2	G1	353

NOTE — The dimensions indicated relate to every type of mounting shown in all other figures.

1) Dimensions KK and AM given for the piston rod end threads correspond to the "long" type as in ISO 4395.

2) The inch series of port threads EE is chosen in accordance with ISO 228-1. A definitive choice of port threads EE will be made later.

3) Dimension VD is given either in the national standards, where they exist, or by manufacturers of cylinders.

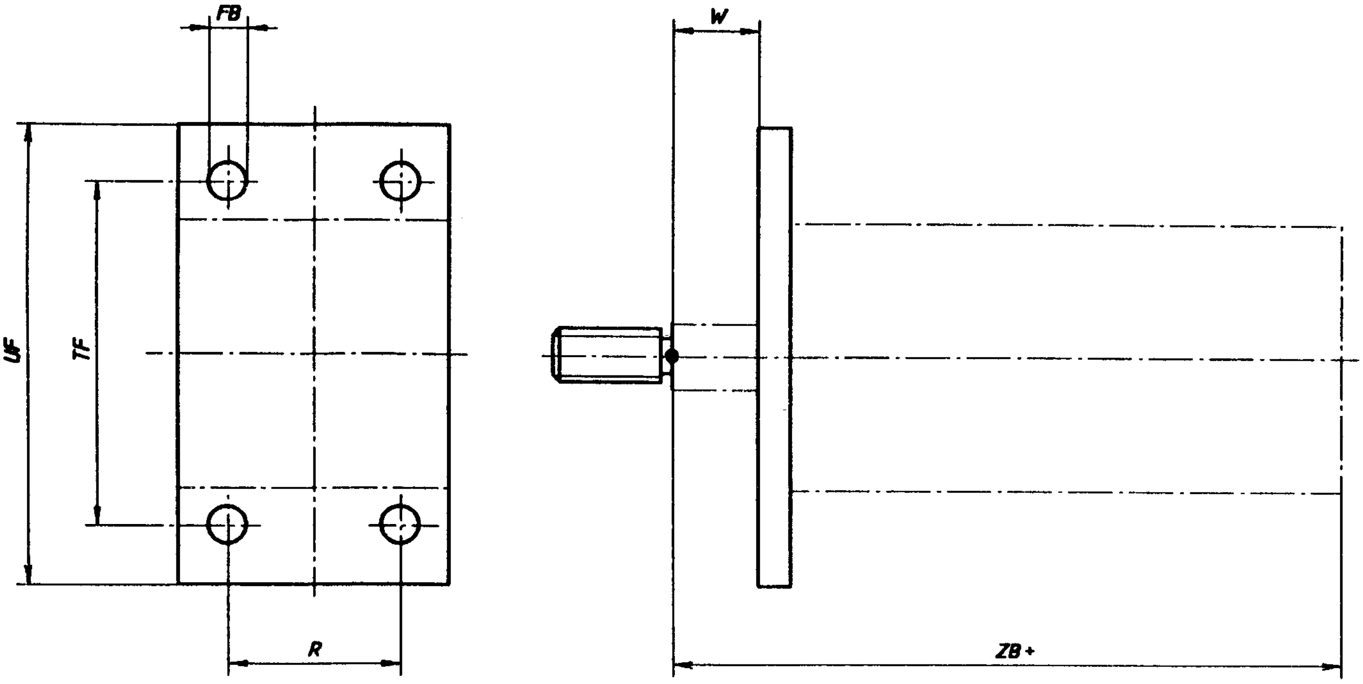

Figure 2 — MF1 — Head mounting, rectangular flange

Table 3 — Dimensions of head mountings, rectangular flange

Dimensions in millimetres

Bore	*UF*	*TF*	*FB*	*R*	*W*		*ZB*
	max.	JS14	H13	JS14	nom.	tol.	max.
32	86	64	7	32	16	± 1,6	124
40	96	72	9	36	20		142
50	115	90	9	45	25		149
63	130	100	9	50	25	± 2	165
80	165	126	12	63	30		182
100	187	150	14	75	35		198
125	224	180	16	90	45	± 2,5	235
160	280	230	18	115	60		270
200	320	270	22	135	70		285
250	395	330	26	165	80		320
320	475	400	33	200	90		355

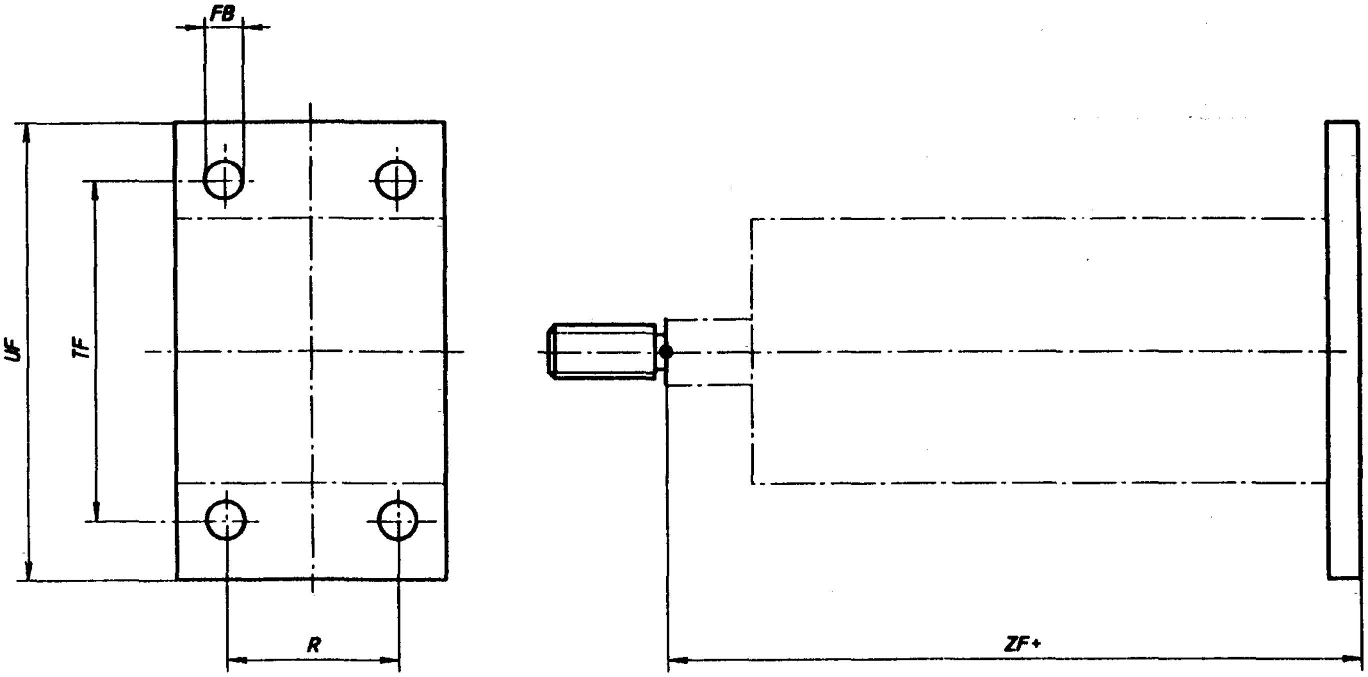

Figure 3 — MF2 — Cap mounting, rectangular flange

Table 4 — Dimensions of cap mounting, rectangular flange

Dimensions in millimetres

Bore	*UF*	*TF*	*FB*	*R*	*ZF* [1]	
	max.	JS14	H13	JS14	nom.	tol.
32	86	64	7	32	130	± 1,25
40	96	72	9	36	145	
50	115	90	9	45	155	
63	130	100	9	50	170	± 1,6
80	165	126	12	63	190	
100	187	150	14	75	205	
125	224	180	16	90	245	± 2
160	280	230	18	115	280	
200	320	270	22	135	300	
250	395	330	26	165	330	
320	475	400	33	200	370	± 2,5

1) See note 3 in clause 4.

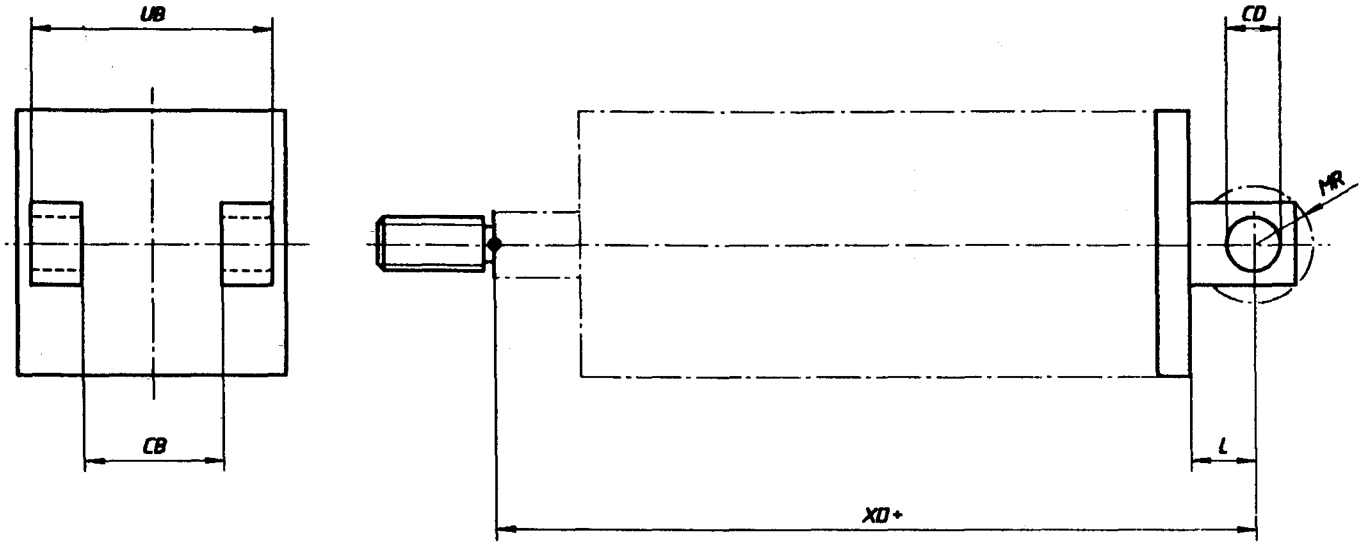

Figure 4 — MP2 — Cap mounting, detachable clevis

Table 5 — Dimensions of cap mountings, detachable clevis

Dimensions in millimetres

Bore	UB	CB	CD	MR	L	XD 1)	
	h14	H14	H9	max.	min.	nom.	tol.
32	45	26	10	11	12	142	± 1,25
40	52	28	12	13	15	160	
50	60	32	12	13	15	170	
63	70	40	16	17	20	190	± 1,6
80	90	50	16	17	20	210	
100	110	60	20	21	25	230	
125	130	70	25	26	30	275	± 2
160	170	90	30	31	35	315	
200	170	90	30	31	35	335	
250	200	110	40	41	45	375	
320	220	120	45	46	50	420	± 2,5

1) See note 3 in clause 4.

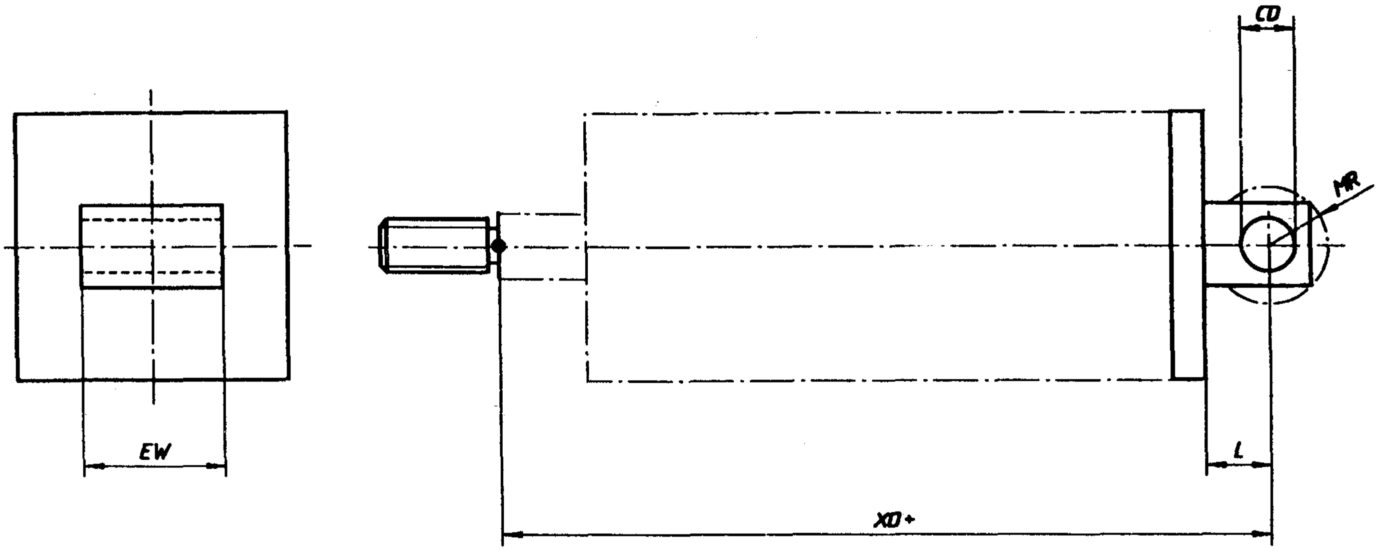

Figure 5 — MP4 — Cap mounting, detachable eye

Table 6 — Dimensions of cap mountings, detachable eye

Dimensions in millimetres

Bore	*EW*		*CD*	*MR*	*L*	*XD* [1]	
	nom.	tol.	H9	max.	min.	nom.	tol.
32	26	$^{-0,2}_{-0,6}$	10	11	12	142	± 1,25
40	28		12	13	15	160	
50	32		12	13	15	170	
63	40		16	17	20	190	± 1,6
80	50		16	17	20	210	
100	60		20	21	25	230	
125	70	$^{-0,5}_{-1,2}$	25	26	30	275	± 2
160	90		30	31	35	315	
200	90		30	31	35	335	
250	110		40	41	45	375	
320	120		45	46	50	420	± 2,5

1) See note 3 in clause 4.

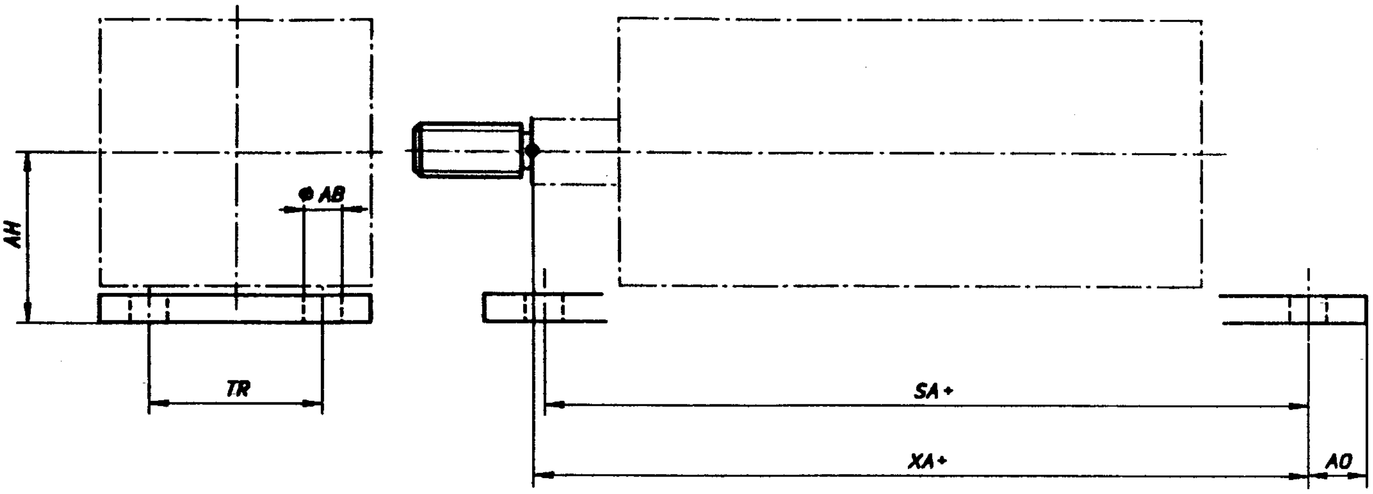

Figure 6 — MS1 — Mounting with end angles

Table 7 — Dimensions of mountings with end angles

Dimensions in millimetres

Bore	*AH*	*TR*	*AB*	*SA* 1)		*XA* 1)		*AO*
	JS15	JS14	H13	nom.	tol.	nom.	tol.	max.
32	32	32	7	142	± 1,25	144	± 1,25	11
40	36	36	9	161		163		15
50	45	45	9	170		175		15
63	50	50	9	185	± 1,6	190	± 1,6	15
80	63	63	12	210		215		20
100	71	75	14	220		230		25
125	90	90	16	250	± 2	270	± 2	25
160	115	115	18	300		320		25
200	135	135	22	320		345		35
250	165	165	26	350		380		40
320	200	200	33	390	± 2,5	425	± 2,5	45
1) See note 3 in clause 4.								

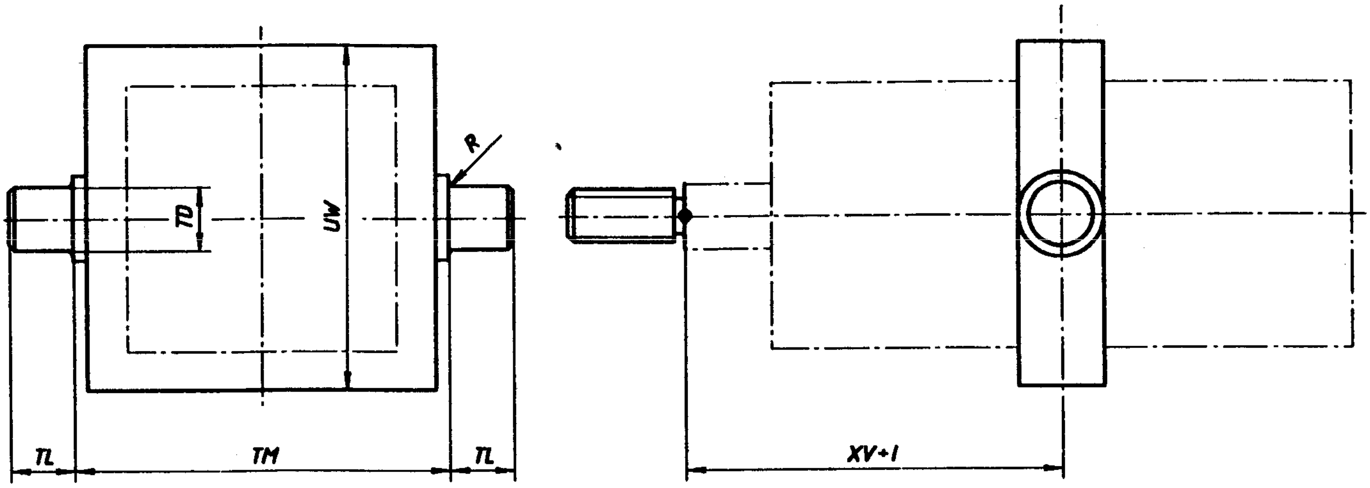

Figure 7 — MT4 — Mounting with intermediate fixed or movable trunnion (male)

Table 8 — Dimensions of mountings with intermediate fixed or movable trunnions (male)

Dimensions in millimetres

Bore	*UW*	*TD*	*R*	*TL*	*TM*	*XV* 1)	
	max.	e9	max.	h14	h14	nom.	tol.
32	65	12	1	12	50	73	± 2
40	75	16	1,5	16	63	82,5	
50	95	16	1,6	16	75	90	
63	105	20	1,6	20	90	97,5	
80	130	20	1,6	20	110	110	
100	145	25	2	25	132	120	
125	175	25	2	25	160	145	± 2,5
160	220	32	2,5	32	200	170	
200	260	32	2,5	32	250	185	
250	320	40	3,2	40	320	205	
320	400	50	3,2	50	400	230	

1) The given dimension XV corresponds to a position of the trunnion placed at an equal distance from the basic body utmost faces in the case of a zero-stroke cylinder. Users are allowed to choose other positions only with the manufacturer's approval.

See note 3 in clause 4.

For a non-zero stroke, apply: $XV = \frac{(ZF +) + W}{2}$

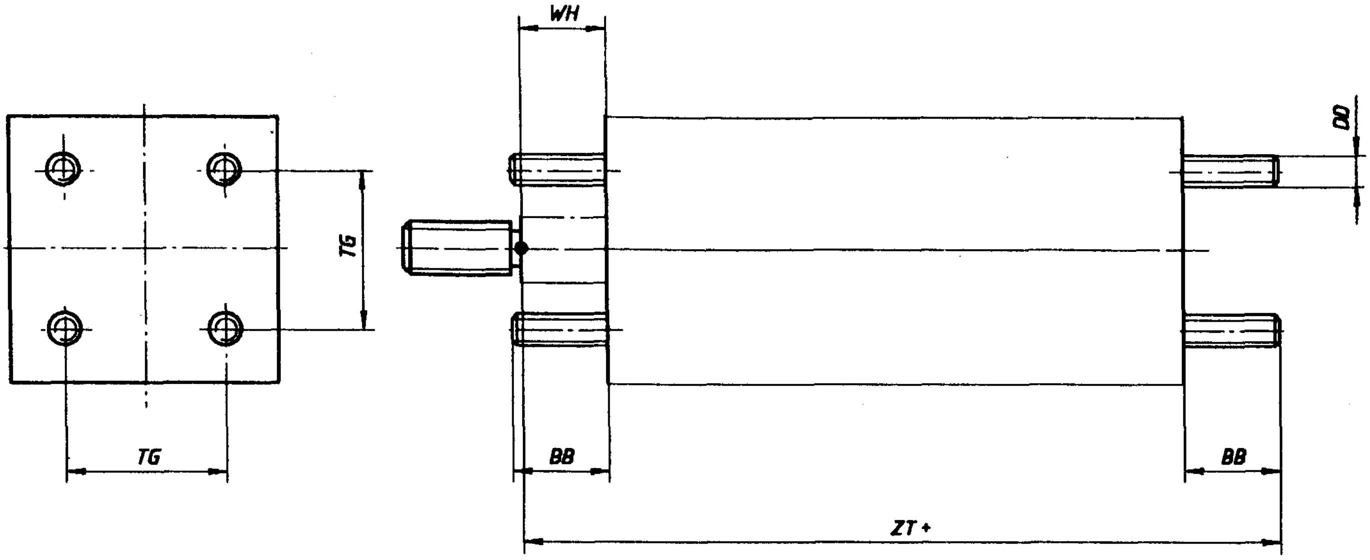

Figure 8 — MX1 — Mounting with studs or tie rods extended at both ends

Table 9 — Dimensions of mountings with studs or tie rods extended at both ends

Dimensions in millimetres

Bore	*BB*		*DD*	*TG*	*WH*	*ZT*
	nom.	tol.			min.	max.
32	17	$^{+3}_{0}$	1)	1)	16	147
40	17				20	162
50	23				25	178
63	23				25	193
80	28				30	218
100	28				35	233
125	34	$^{+5}_{0}$			45	279
160	42				60	322
200	42				70	342
250	50				80	380
320	60				90	430

1) These dimensions are either fixed by national standards or they are stated by the manufacturers.

Annex A
(informative)

Bibliography

[1] ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

[2] ISO 3320:1987, *Fluid power systems and components — Cylinder bores and piston rod diameters — Metric series.*

[3] ISO 3322:1985, *Fluid power systems and components — Cylinders — Nominal pressures.*

[4] ISO 6099:1985, *Fluid power systems and components — Cylinders — Identification code for mounting dimensions and mounting types.*

[5] ISO 6430:1992, *Pneumatic fluid power — Single rod cylinders, 1 000 kPa (10 bar) series, with integral mountings, bores from 32 mm to 250 mm — Mounting dimensions.*

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